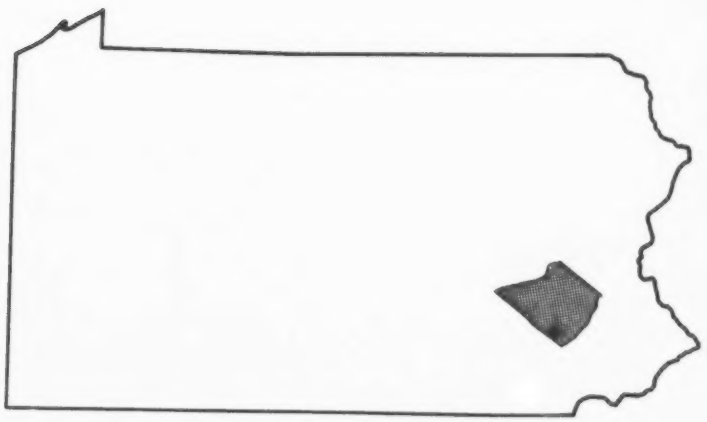
FLOOD INSURANCE STUDY

U. S. GOVT. PUBS.
DEPOSITORY 376

TOWNSHIP OF BRECKNOCK, PENNSYLVANIA
BERKS COUNTY



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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWNSHIP OF BRECKNOCK, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Brecknock, Berks County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Brecknock to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by Huth Engineers, Inc., for the Federal Insurance Administration, under Contract No. H-4760. This work was completed in September 1979.

1.3 Coordination

In April 1978, the nature and purpose of the Flood Insurance Study were explained and the streams studied by detailed methods identified at an initial Consultation and Coordination Officer's (CCO) meeting attended by representatives of the FIA, the Township of

Brecknock, and the study contractor. A notice announcing the beginning of the study and stating its objectives was placed in the Reading Eagle newspaper.

During the course of the study, contact was made with the Soil Conservation Service, the U. S. Army Corps of Engineers (COE), the U. S. Geological Survey (USGS), the Pennsylvania Department of Environmental Resources, the Delaware River Basin Commission, and the Berks County Planning Commission for information pertaining to the flood problems in the township. Also, a letter was sent to community officials requesting pertinent information. On February 26, 1980, a final CCO meeting was held with representatives of the FIA, the township, and the study contractor to present the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Brecknock, Berks County, Pennsylvania. The area of study is shown on the Vicinity Map (Figure 1).

Muddy Creek from the southwestern corporate limits to the Diehl Road bridge, Allegheny Creek from the confluence with Tributary No. 3 to a point 3,200 feet upstream, Tributary No. 2, and Tributary No. 3 were studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through September 1984.

The remaining portions of Muddy Creek and Allegheny Creek along with several tributaries were studied by approximate methods. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. Negligible flood hazards were determined for Tributary No. 7, therefore, no flood boundaries were delineated in this area. The scope and methods of study were proposed to and agreed upon by the FIA.

2.2 Community Description

The Township of Brecknock is located in the southern portion of Berks County in southeastern Pennsylvania. It is bordered by the

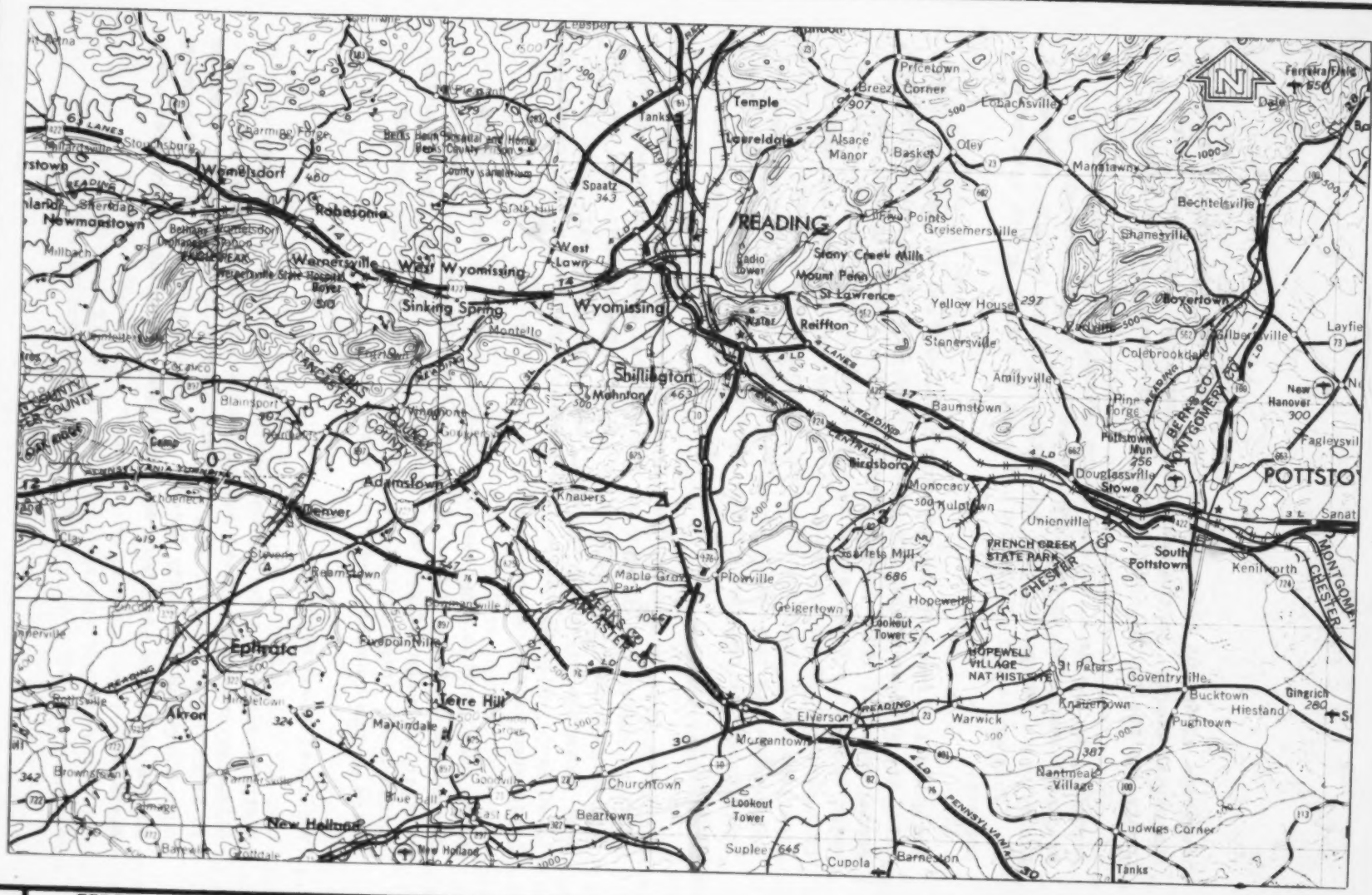


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

Townships of Spring and Cumru to the north, the Township of Brecknock (Lancaster County) to the west, the Township of Caernarvon (Berks County) to the south, and the Township of Robeson to the east.

According to the U. S. Bureau of the Census, the population of Brecknock was 1,956 in 1970 (Reference 1). The Commonwealth of Pennsylvania has projected a population of 2,210 by 1980 (Reference 2). This projected population reflects an annual growth rate of 0.8 percent.

The general climate of the township is classified as humid continental. The average annual precipitation is 41 inches, and the average annual snowfall is 30 inches (Reference 3). Thunderstorms, the major cause of precipitation in the township, occur mostly from May to September. These storms are localized in character and usually associated with localized flooding. Major floods that are regional occurrences are the result of either large tropical disturbances (hurricanes) or combined events, as when heavy rains occur during a snowmelt.

Brecknock contains a total land area of 17.2 square miles and is rural in character. Productive agricultural land is located in valleys surrounded by forest-covered ridges. These hills rise over 500 feet above the adjoining valleys. Land elevations vary from 350 to 1,040 feet. Alleghenyville, the largest community in the township, is located in one of the valleys.

Muddy Creek drains the township's southern section and flows west through Maple Grove Park. Allegheny Creek drains the township's central valley and flows east through the Village of Alleghenyville. Little Muddy Creek drains a predominant portion of the northern third of the township and flows west.

2.3 Principal Flood Problems

Historic data and information resulting from this study show that Allegheny and Muddy Creeks are the major sources of flood problems in Brecknock. In 1972, Tropical Storm Agnes caused a major flood on both Muddy and Allegheny Creeks. An estimate of the flood frequency is not available, as there are no stream gage stations located near Brecknock.

2.4 Flood Protection Measures

At present, there are no structural flood protection measures within the Township of Brecknock, and none are planned for the near future. The township's zoning ordinance does not contain a flood plain regulation restricting development in flood-prone areas (Reference 4). The township is presently reviewing their zoning ordinance and hopes to add flood plain regulations.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

The discharges for the streams studied by detailed methods were developed using a USGS regionalized method, Model 6-B (Reference 5). The 500-year flood was developed through the extension of the relationship of frequencies for the 10-, 50-, and 100-year floods.

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MUDDY CREEK					
At the southwestern township corporate limits	5.4	690	1,230	1,530	2,300
At Maple Grove Park	4.3	540	960	1,200	1,790
At the Maple Grove Drag Strip	2.6	330	580	710	1,050
ALLEGHENY CREEK					
Downstream of the confluence with Tributary No. 2	4.3	540	970	1,200	1,800
Upstream of the confluence with Tributary No. 3	1.8	230	390	480	700
TRIBUTARY NO. 2					
Upstream of the confluence with Allegheny Creek	0.6	70	120	140	200
TRIBUTARY NO. 3					
Upstream of the confluence with Allegheny Creek	0.9	120	200	240	350

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Cross-section data for streams in the area were obtained from aerial photographs (Reference 6); the below-water sections were obtained by field measurement. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For

stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

Roughness coefficients (Manning's "n" values) for the streams studied by detailed methods were estimated by field inspection and based on engineering judgment. For Muddy Creek, the channel roughness values ranged between 0.035 and 0.040, and the overbank values ranged between 0.035 and 0.080. The Allegheny Creek channel roughness values ranged between 0.040 and 0.050, and the overbank values ranged between 0.040 and 0.080. For Tributary No. 2, the channel roughness value was 0.040, and the overbank values ranged between 0.040 and 0.060. For Tributary No. 3, the channel roughness values ranged between 0.040 and 0.080, and the overbank values ranged between 0.035 and 0.080.

Water-surface profiles of floods of the selected recurrence intervals were determined using the COE HEC-2 step-backwater computer program (Reference 7). Starting water-surface elevations for Muddy Creek, Allegheny Creek, Tributary No. 2, and Tributary No. 3 were calculated using the slope/area method.

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year

flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 5 feet (Reference 6). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

For the streams studied by approximate methods, the 100-year flood boundaries were delineated using the Flood Hazard Boundary Map for the Township of Brecknock (Reference 8).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Muddy Creek								
A	40	544[2]	1,553	1.9	496.6	496.6	496.6	0.0
B	650	150	436	4.5	496.8	496.8	496.8	0.0
C	1,990	150	381	7.2	499.8	499.8	500.4	0.6
D	2,980	113	488	3.1	502.2	502.2	502.5	0.3
E	3,530	100	197	8.3	505.6	505.6	505.6	0.0
F	4,055	100	476	3.1	507.3	507.3	507.7	0.4
G	4,182	180	742	2.9	508.7	508.7	508.7	0.0
H	4,632	200	766	2.6	508.9	508.9	509.0	0.1
I	5,232	448	579	4.8	509.4	509.4	509.8	0.4
J	5,867	292	604	3.9	512.3	512.3	512.3	0.0
K	6,842	100	669	1.2	519.7	519.7	519.7	0.0
L	7,592	75	185	4.5	519.7	519.7	519.7	0.0
M	8,592	75	140	6.0	522.7	522.7	523.3	0.6
N	9,502	64	141	5.4	527.4	527.4	527.9	0.5
Allegheny Creek								
A	19,510	32	73	6.6	483.4	483.4	483.4	0.0
B	20,460	35	86	5.6	494.6	494.6	495.5	0.9
C	21,058	26	56	8.5	502.3	502.3	502.3	0.0

[1] Feet above corporate limits

[2] This width extends beyond corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOODWAY DATA

MUDDY CREEK AND ALLEGHENY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Allegheny Creek (continued)								
D	21,408	28	66	7.3	508.3	508.3	508.3	0.0
E	21,558	16	49	9.8	514.6	514.6	514.6	0.0
F	21,691	37	109	4.4	517.9	517.9	517.9	0.0
G	22,086	50	75	7.9	526.3	526.3	526.9	0.6
Tributary No. 2								
A	7,648	108	309	0.5	398.2	398.2	398.2	0.0
B	7,973	37	27	5.1	401.8	401.8	401.8	0.0
C	8,423	35	39	3.6	408.1	408.1	408.3	0.2
D	8,948	23	24	5.8	418.1	418.1	418.1	0.0
E	9,198	30	26	5.4	425.5	425.5	425.5	0.0
Tributary No. 3								
A	19,500	39	90	2.7	481.5	481.5	481.5	0.0
B	19,784	41	152	1.6	488.4	488.4	488.4	0.0
C	19,959	30	131	1.8	491.1	491.1	491.1	0.0
D	20,409	19	32	7.4	498.1	498.1	498.1	0.0
E	20,879	37	55	4.4	508.4	508.4	508.4	0.0

[1] Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOODWAY DATA

ALLEGHENY CREEK, TRIBUTARY NO. 2 AND TRIBUTARY NO. 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Tributary No. 3 (continued)								
F	21,037	70	154	1.7	520.9	520.9	520.9	0.0
G	21,387	25	36	6.8	530.0	530.0	530.0	0.0
H	21,762	18	42	5.8	541.6	541.6	541.6	0.0
I	21,917	50	75	3.2	545.8	545.8	545.8	0.0
J	22,417	43	42	5.8	566.0	566.0	566.2	0.2
K	22,827	16	51	4.7	578.3	578.3	578.5	0.2
L	22,963	50	171	1.2	590.3	590.3	590.3	0.0
M	23,273	51	45	5.8	604.2	604.2	604.2	0.0

[1] Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

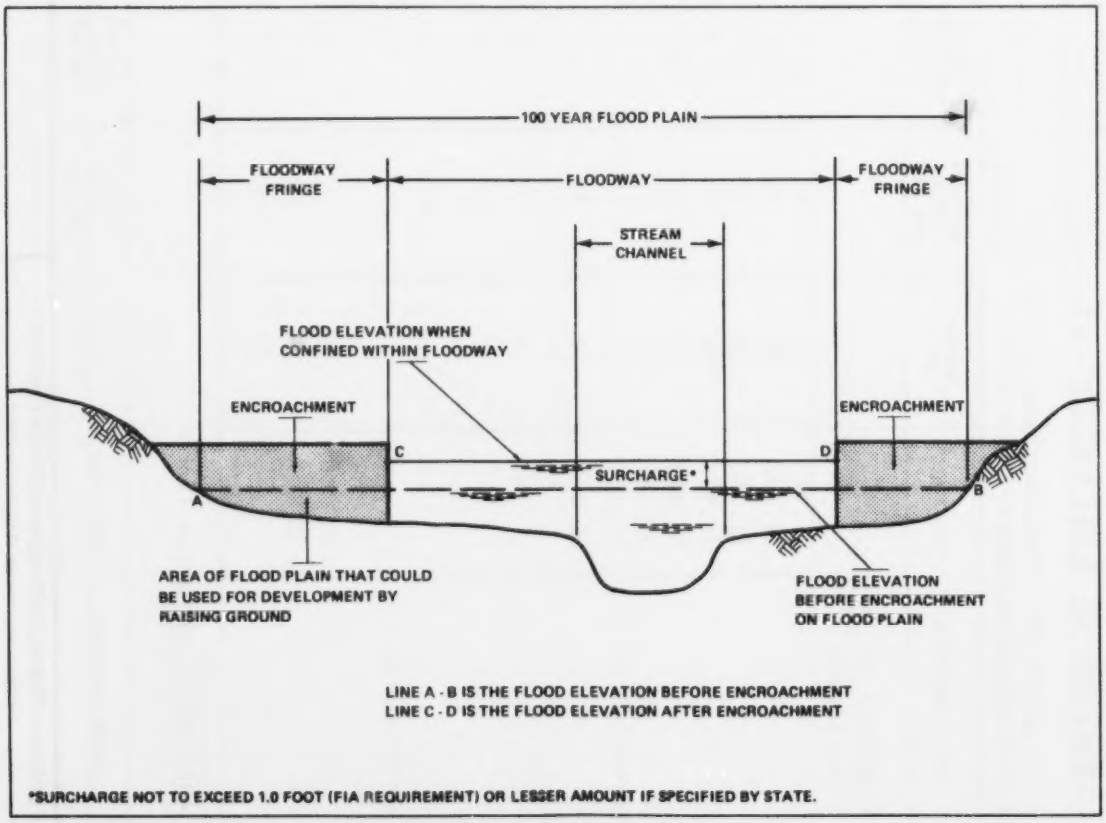
TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOODWAY DATA

TRIBUTARY NO. 3

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown. Portions of the floodway widths of Muddy Creek are located outside the corporate limits of the Township of Brecknock.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source affecting the Township of Brecknock.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Township of Brecknock are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Muddy Creek Reach 1	06	-1.0	-0.4	+0.7	010	A2	Varies
Allegheny Creek Reach 1	05	-0.9	-0.2	+0.5	010	A2	Varies
Tributary No. 2 Reach 1	02	-0.5	-0.1	+0.3	005	A1	Varies
Tributary No. 3 Reach 1	05	-0.8	-0.3	+0.6	010	A2	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOOD INSURANCE ZONE DATA

MUDDY CREEK, ALLEGHENY CREEK,
TRIBUTARY NO. 2, AND TRIBUTARY NO. 3

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Township of Brecknock was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1, A2:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Township of Brecknock.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Township of Brecknock is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-

foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

The Flood Insurance Study for the Township of Cumru has been prepared (Reference 9). The results of this study are in exact agreement with the results of that study. Also, the Flood Hazard Boundary Map for the Township of Brecknock (Berks County) has been published (Reference 8).

Flood Insurance Studies for the Township of Brecknock (Lancaster County) and the Township of Robeson are currently being prepared (References 10 and 11). The results of this study will be in exact agreement with the results of those studies.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region III Office, Curtis Building, Room 700, Sixth and Walnut Streets, Philadelphia, Pennsylvania 19106.

8.0 BIBLIOGRAPHY AND REFERENCES

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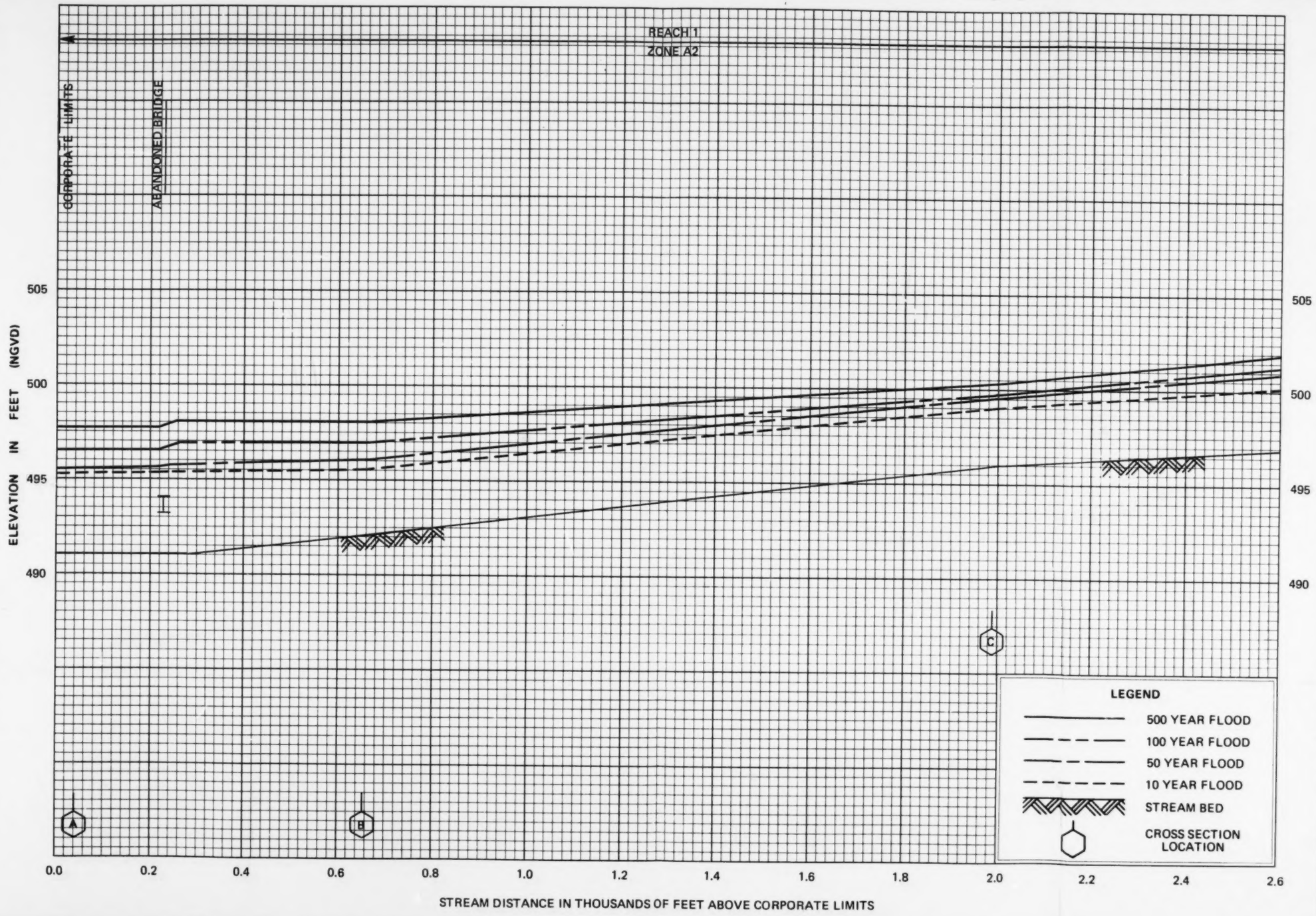


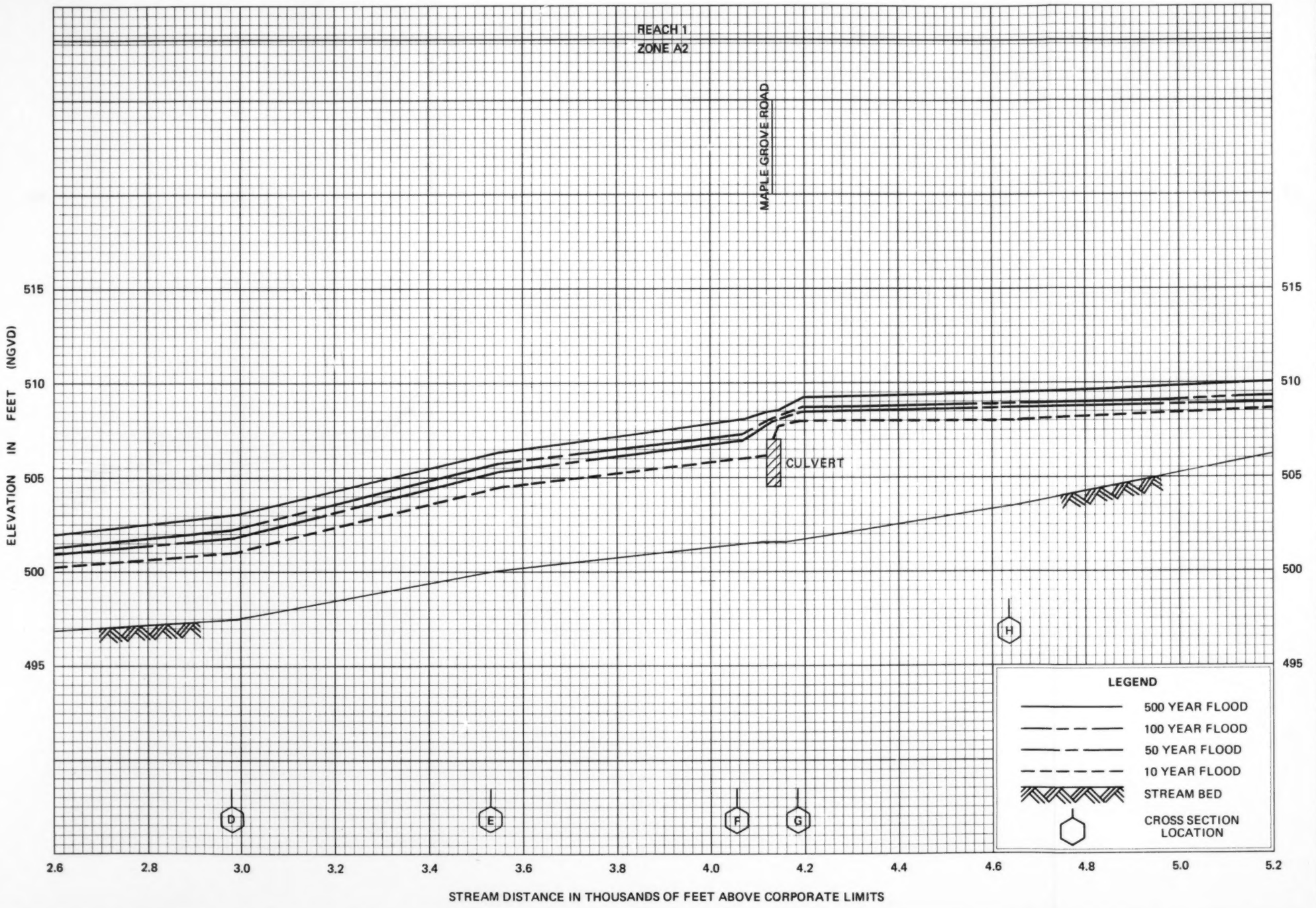
FLOOD PROFILES

MUDDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

01P



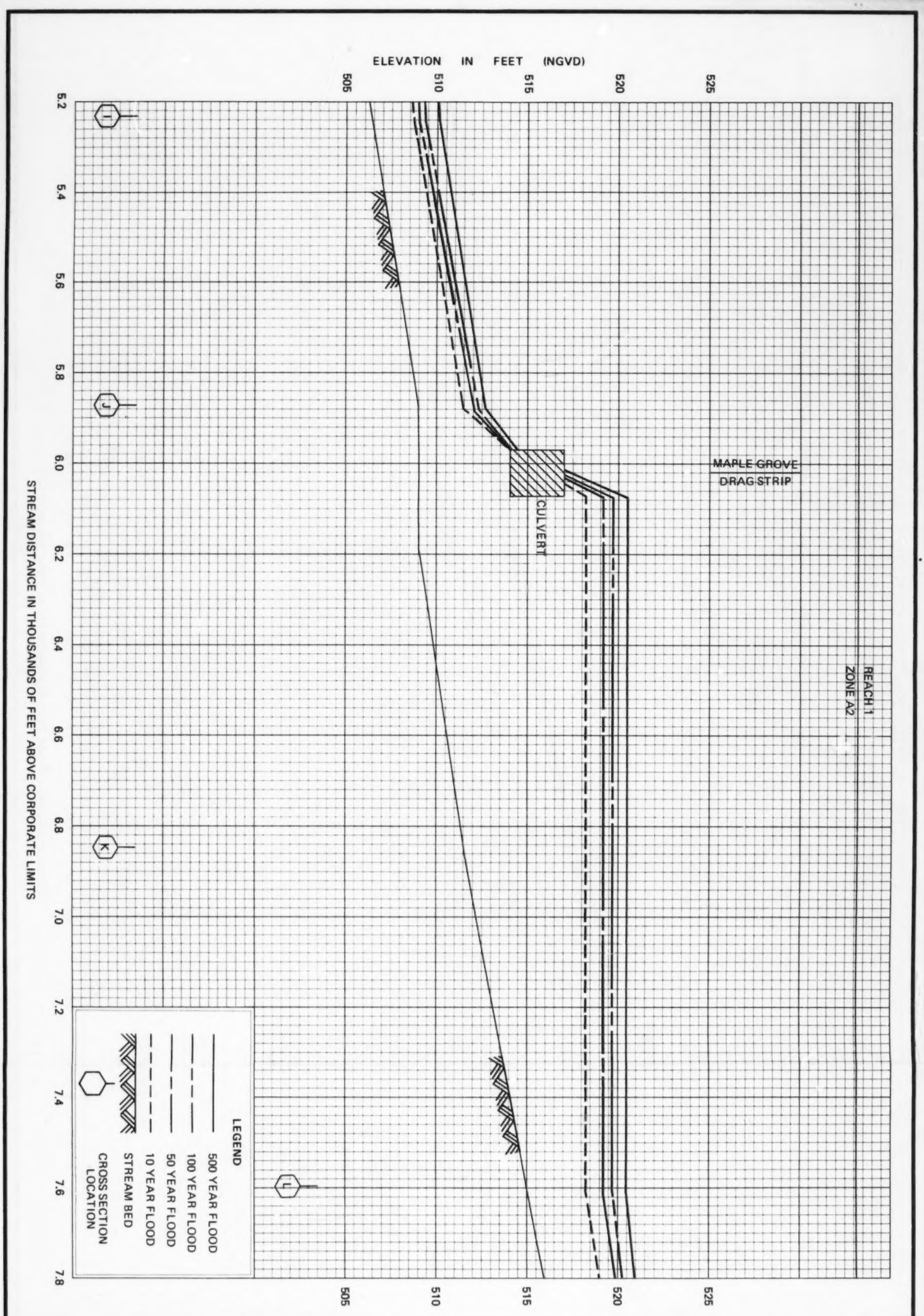
FLOOD PROFILES

MUDDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

02P



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(BERKS CO.)

FLOOD PROFILES

MUDDY CREEK

03P

REACH 1
ZONE A2

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NGVD)

530
525
520
515

7.8 8.0 8.2 8.4 8.6 8.8 9.0 9.2 9.4 9.6 9.8

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CORPORATE LIMITS

M
N

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

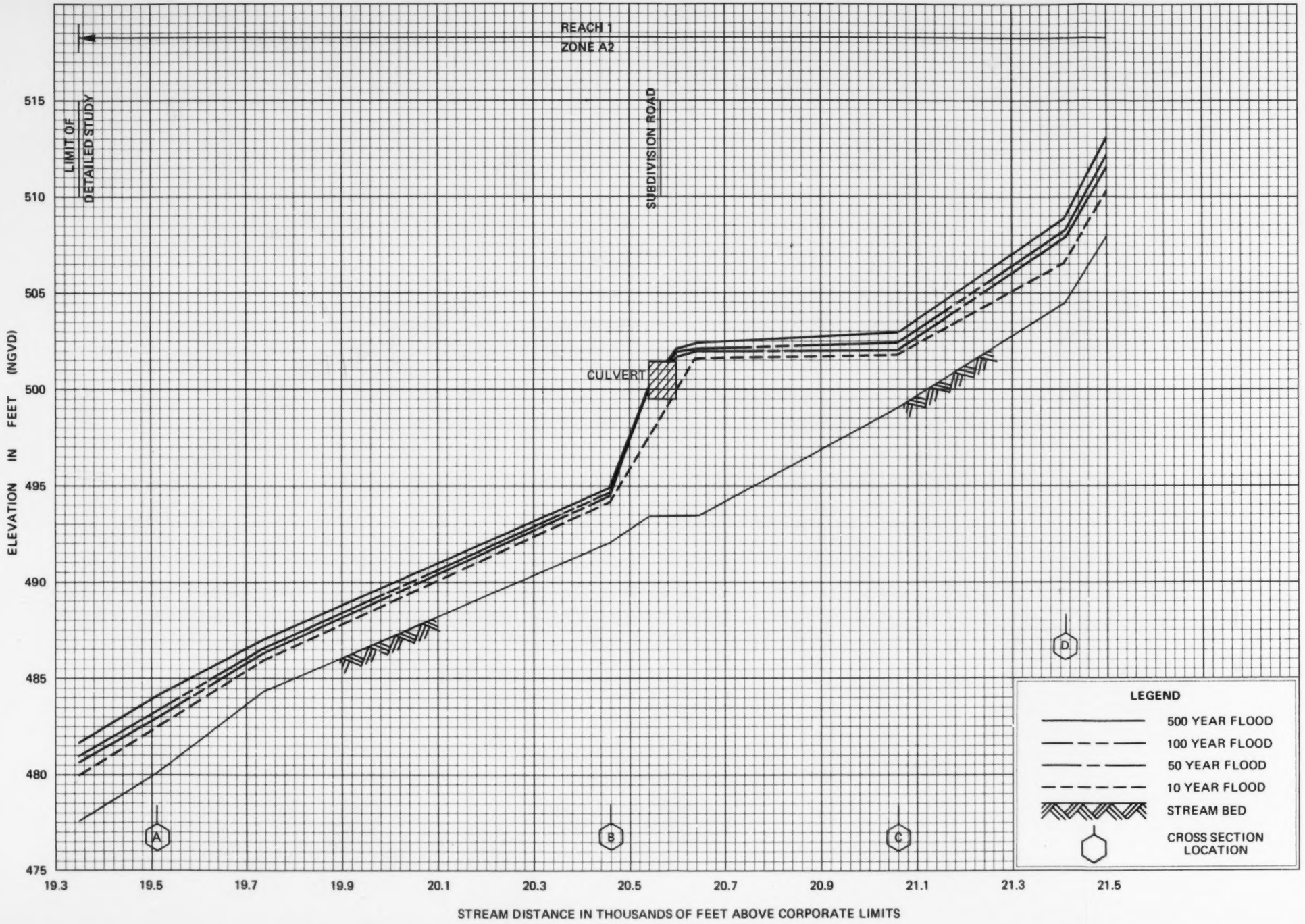
FLOOD PROFILES

MUDDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

04P



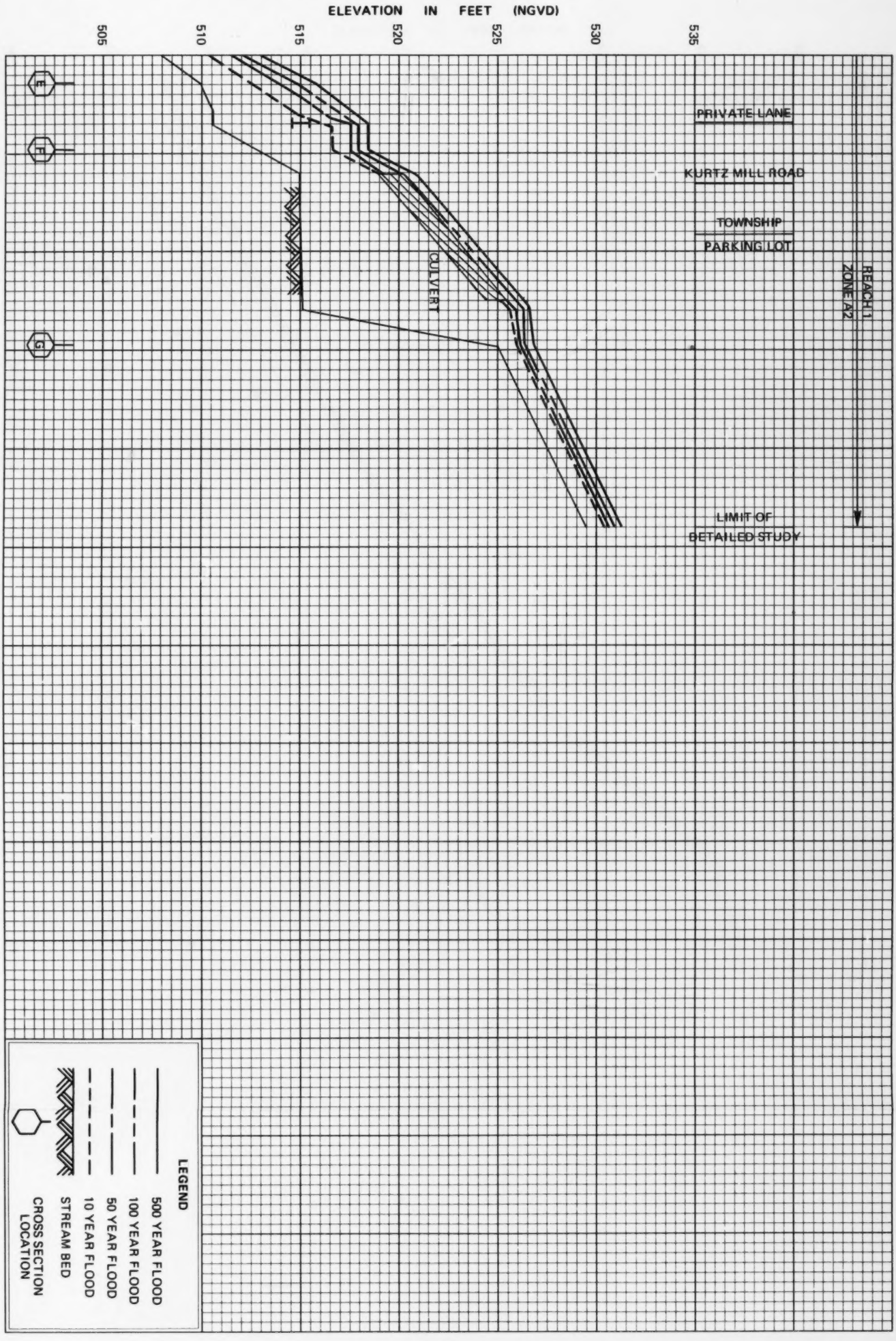
FLOOD PROFILES

ALLEGHENY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

05P



06P

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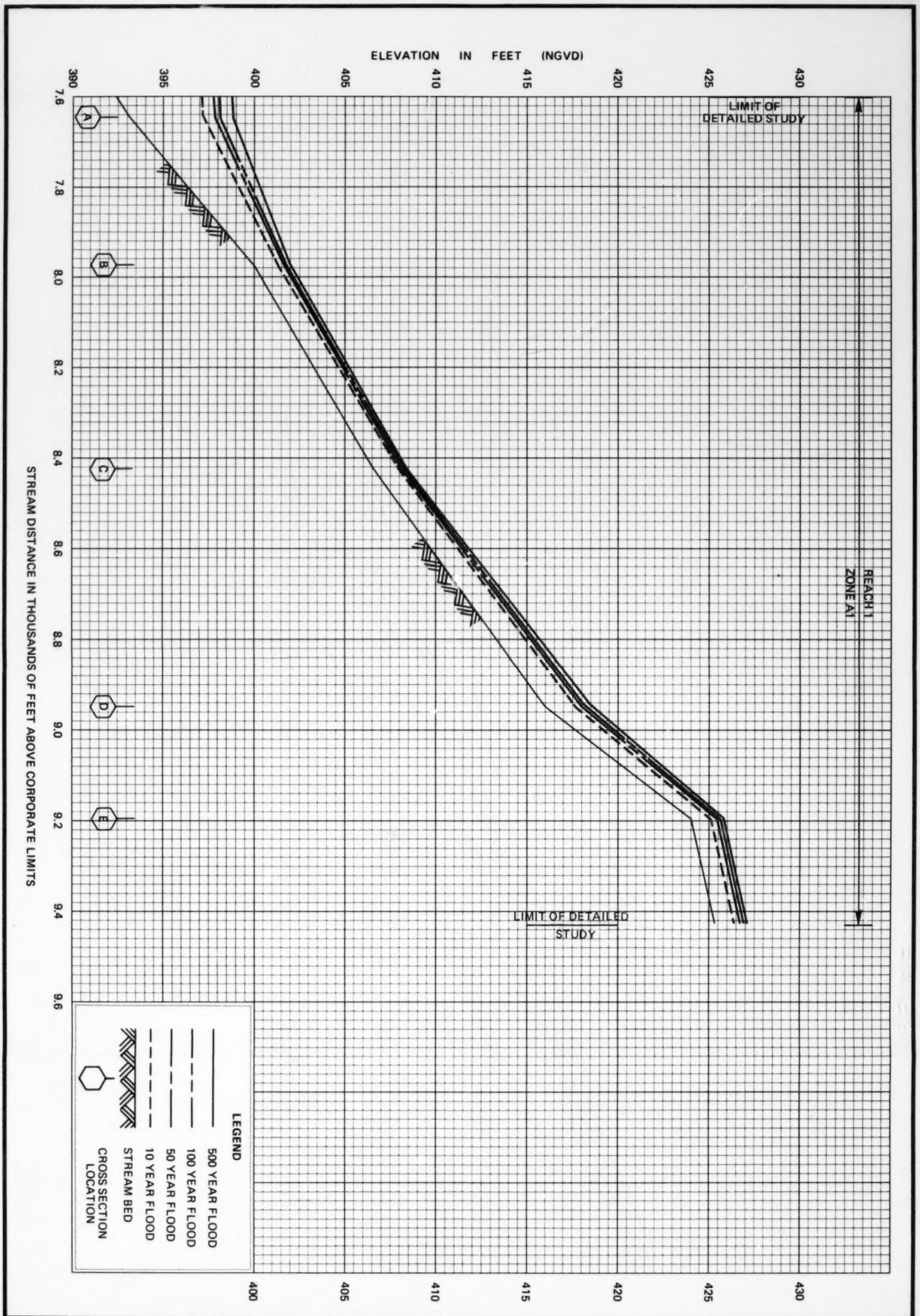
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOOD PROFILES

ALLEGHENY CREEK



07P

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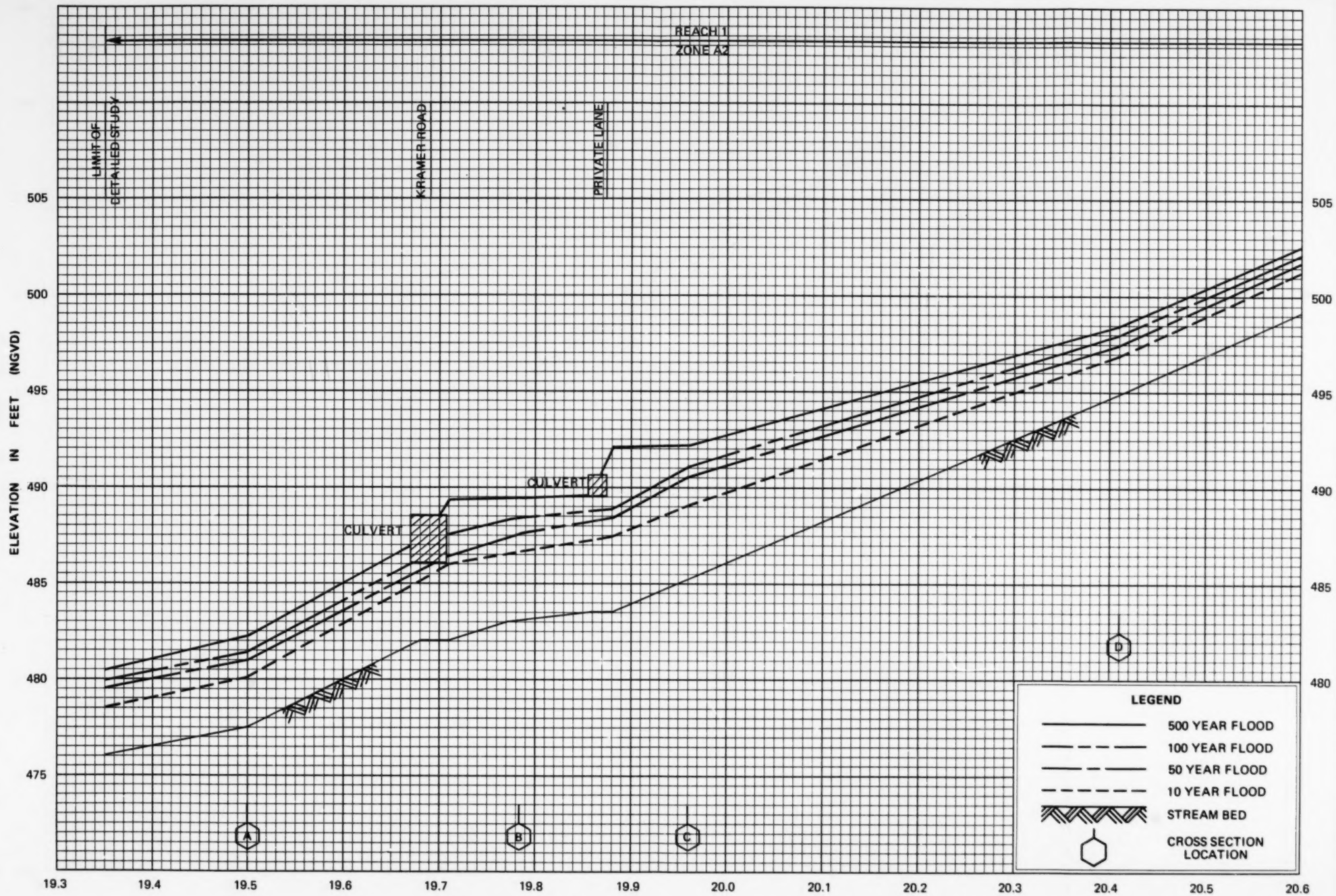
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

FLOOD PROFILES

TRIBUTARY NO. 2



FLOOD PROFILES

TRIBUTARY NO. 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

08P

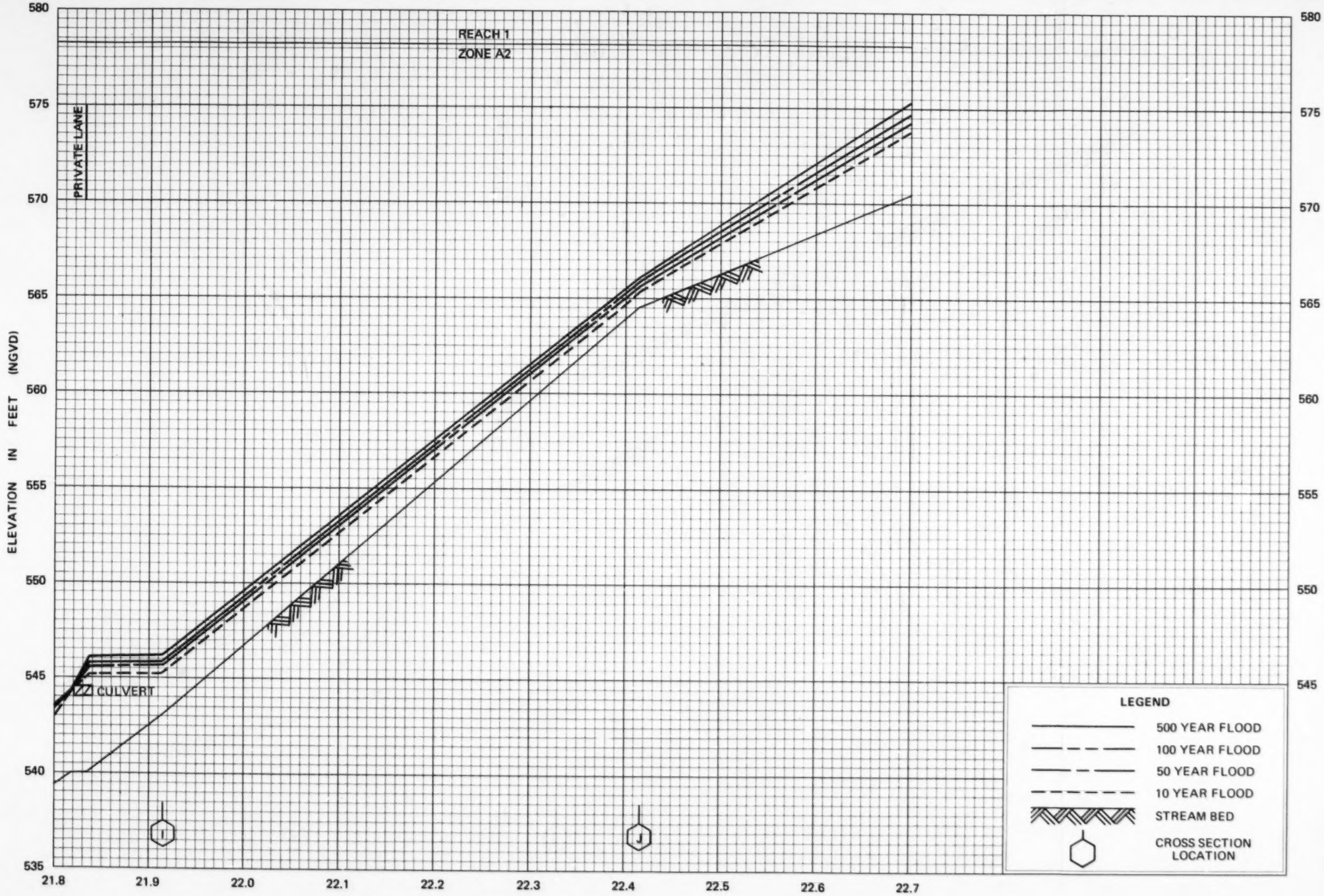
FLOOD PROFILES

TRIBUTARY NO. 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
(BERKS CO.)

09P



FLOOD PROFILES

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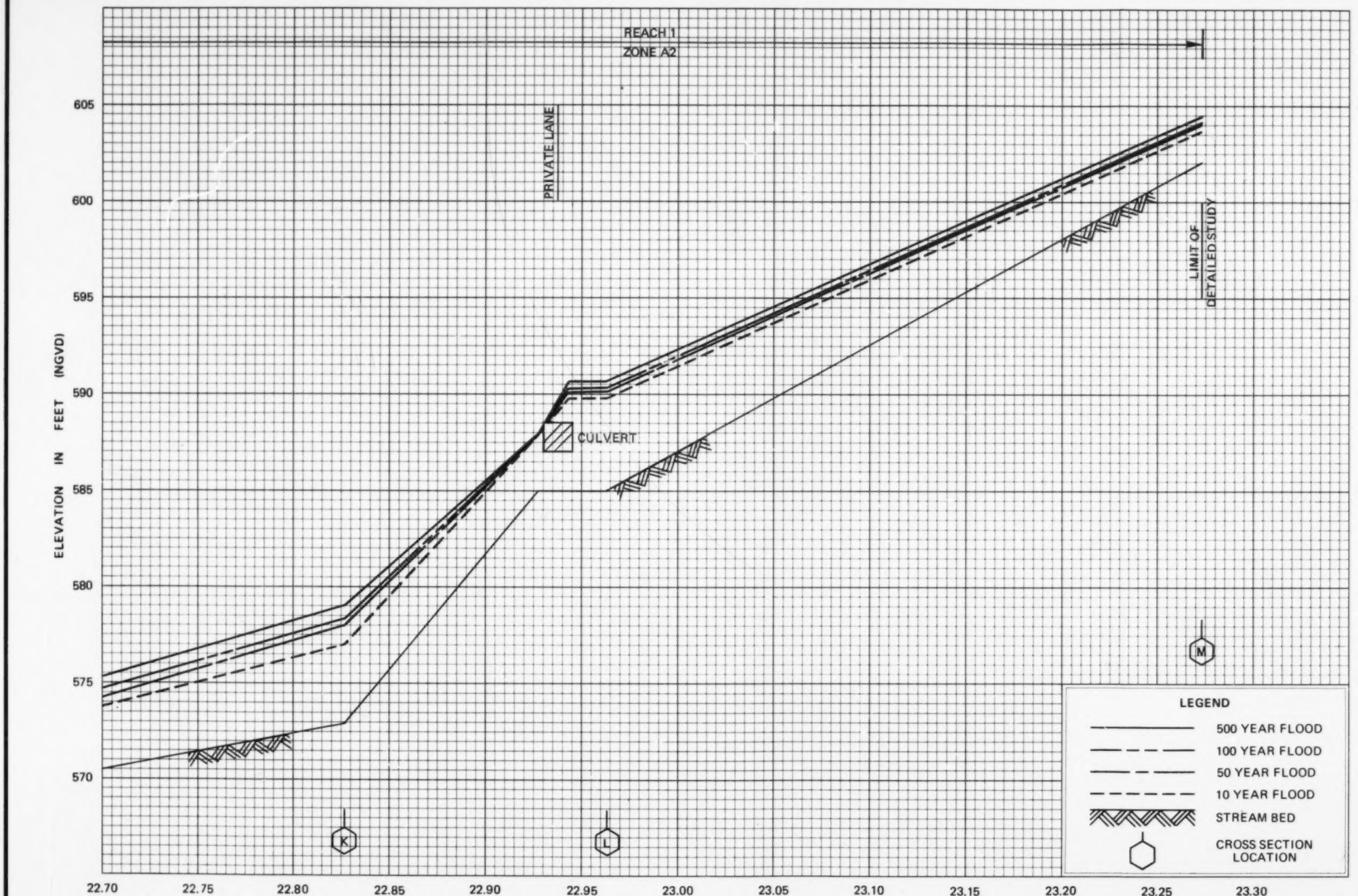
10P



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FLOOD PROFILES

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Federal Insurance Administration

TOWNSHIP OF BRECKNOCK, PA
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11P